

What is claimed is:

1. An isolated nucleic acid molecule encoding an olfactory receptor (ORX) polypeptide, wherein said molecule comprises a nucleotide sequence that is at least 95% identical to an ORX nucleic acid sequence, or the complement of said nucleic acid molecule.
2. The nucleic acid molecule of claim 1, wherein said molecule hybridizes under stringent conditions to a nucleic acid sequence complementary to an ORX nucleic acid molecule, or the complement of said nucleic acid molecule.
3. The nucleic acid molecule of claim 1, wherein said molecule encodes an ORX polypeptide or an amino acid sequence comprising one or more conservative substitutions in the amino acid sequence of an ORX polypeptide.
4. The nucleic acid molecule of claim 1, wherein said molecule encodes an ORX polypeptide, or the complement of said nucleic acid molecule.
5. An oligonucleotide of less than 100 nucleotides in length, which comprises at least 6 contiguous nucleotides of an ORX nucleic acid molecule, or a complement thereof.
6. A vector comprising the nucleic acid molecule of claim 1.
7. The vector of claim 6, wherein said vector is an expression vector.
8. The vector of claim 6, further comprising a regulatory element operably linked to said nucleic acid molecule.
9. An isolated polypeptide at least 80% identical to a polypeptide selected from the group consisting of:
- (a) an ORX polypeptide;
 - (b) a fragment of an ORX polypeptide, wherein the fragment comprises at least 6 contiguous amino acids of the ORX polypeptide;

- (c) a derivative of an ORX polypeptide;
- (d) an analog of an ORX polypeptide;
- (e) a homolog of an ORX polypeptide;
- (f) a naturally occurring allelic variant of an ORX polypeptide, wherein the polypeptide is encoded by a nucleic acid molecule that hybridizes to an ORX nucleic acid molecule under stringent conditions.

10. An antibody that selectively binds to the polypeptide of claim 9.

Sub B4 11. A method of producing the polypeptide of claim 9, said method comprising the step of culturing a host cell under conditions in which the nucleic acid molecule is expressed.

12. A method of detecting the presence of the polypeptide of claim 9 in a sample, the method comprising contacting the sample with a compound that selectively binds to the polypeptide of claim 9 and determining whether the compound bound to the polypeptide of claim 9 is present in the sample.

13. A method of detecting the presence of the nucleic acid molecule of claim 1 in a sample, the method comprising contacting the sample with a nucleic acid probe or primer that selectively binds to the nucleic acid molecule of claim 1 and determining whether the nucleic acid probe or primer bound to the nucleic acid molecule of claim 1 is present in the sample.

14. A method for modulating the activity of the polypeptide of claim 9, the method comprising contacting a cell sample comprising the polypeptide of claim 9 with a compound that binds to said polypeptide in an amount sufficient to modulate the activity of the polypeptide.

15. A method for assessing the olfactory acuity of a subject, the method comprising:
(a) providing a biological sample comprising nucleic acids from said subject;

- (b) identifying a plurality of nucleic acid sequences homologous to an olfactory receptor nucleic acid sequence in said biological sample;
- (c) determining the number of sequences in said plurality containing open-reading frames;
- (d) determining the number of sequences in said plurality containing olfactory receptor pseudogenes; and
- (e) comparing the number of sequences containing open reading frames to the number of sequences containing olfactory receptor pseudogenes, thereby assessing the olfactory acuity of said subject.

16 The method of claim 15, wherein said subject is a mammal.

17. The method of claim 15, wherein said plurality of nucleic acids homologous to an olfactory receptor nucleic acid sequence is determined by contacting said biological sample with a pair of primers that selectively amplify an olfactory receptor nucleic acid sequence.

18. The method of claim 17, wherein said pair includes OR5B-OR3B (OR5B (TM2), 5'-CCCATGTA(T/C)TT(G/C/T)TT(C/T)CTC(A/G/T)(G/C)(C/T)AA(C/T)(T/C)T(G/A)TC-3' (SEQ ID NO: 432) and 5'-AG(A/G)C(A/T)(A/G)TAAATGAAIGG(A/G)TTCAICAT-3' (SEQ ID NO:433).

19. The method of claim 15, wherein method further comprises calculating a ratio of the number of sequences containing open-reading frames to the number of sequences containing olfactory receptor pseudogenes, and comparing said ratio to a reference ratio for an organism whose olfactory acuity is known.

20. The method of claim 15, wherein said nucleic acid comprises genomic DNA.